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Kramer Electronics, Ltd.

USER MANUAL

Model:

VP-26

Presentation Matrix Switcher

www.camboard.de Tel. 07131 911201ce-info@camboard.de
Fax 07131 911203

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1 Introduction

Welcome to Kramer Electronics! Since 1981, Kramer Electronics has been providing a world of unique, creative, and affordable solutions to the vast range of problems that confront the video, audio, presentation, and broadcasting professional on a daily basis. In recent years, we have redesigned and upgraded most of our line, making the best even better! Our 1,000-plus different models now appear in 11 groups[1] that are clearly defined by function.

Thank you for purchasing the Kramer **VP-26** *Presentation Matrix Switcher*, which is ideal for:

- Presentation and conference room systems
- Production studios
- Rental and staging

The package includes the following items:

- **VP-26** Presentation Matrix Switcher
- Windows®-based Kramer control software
- Null-modem adapter and power cord[2]
- Kramer **RC-IR3** Infrared Remote Control Transmitter (including the required battery and a separate user manual[3])
- This user manual[3]

2 Getting Started

We recommend that you:

- Unpack the equipment carefully and save the original box and packaging materials for possible future shipment
- Review the contents of this user manual
- Use Kramer high performance high resolution cables[4]

1 GROUP 1: Distribution Amplifiers; GROUP 2: Switchers and Matrix Switchers; GROUP 3: Control Systems; GROUP 4: Format/Standards Converters; GROUP 5: Range Extenders and Repeaters; GROUP 6: Specialty AV Products; GROUP 7: Scan Converters and Scalers; GROUP 8: Cables and Connectors; GROUP 9: Room Connectivity; GROUP 10: Accessories and Rack Adapters; GROUP 11: Sierra Products

2 We recommend that you use only the power cord that is supplied with this machine

3 Download up-to-date Kramer user manuals from our Web site at http://www.kramerelectronics.com

4 The complete list of Kramer cables is on our Web site at http://www.kramerelectronics.com

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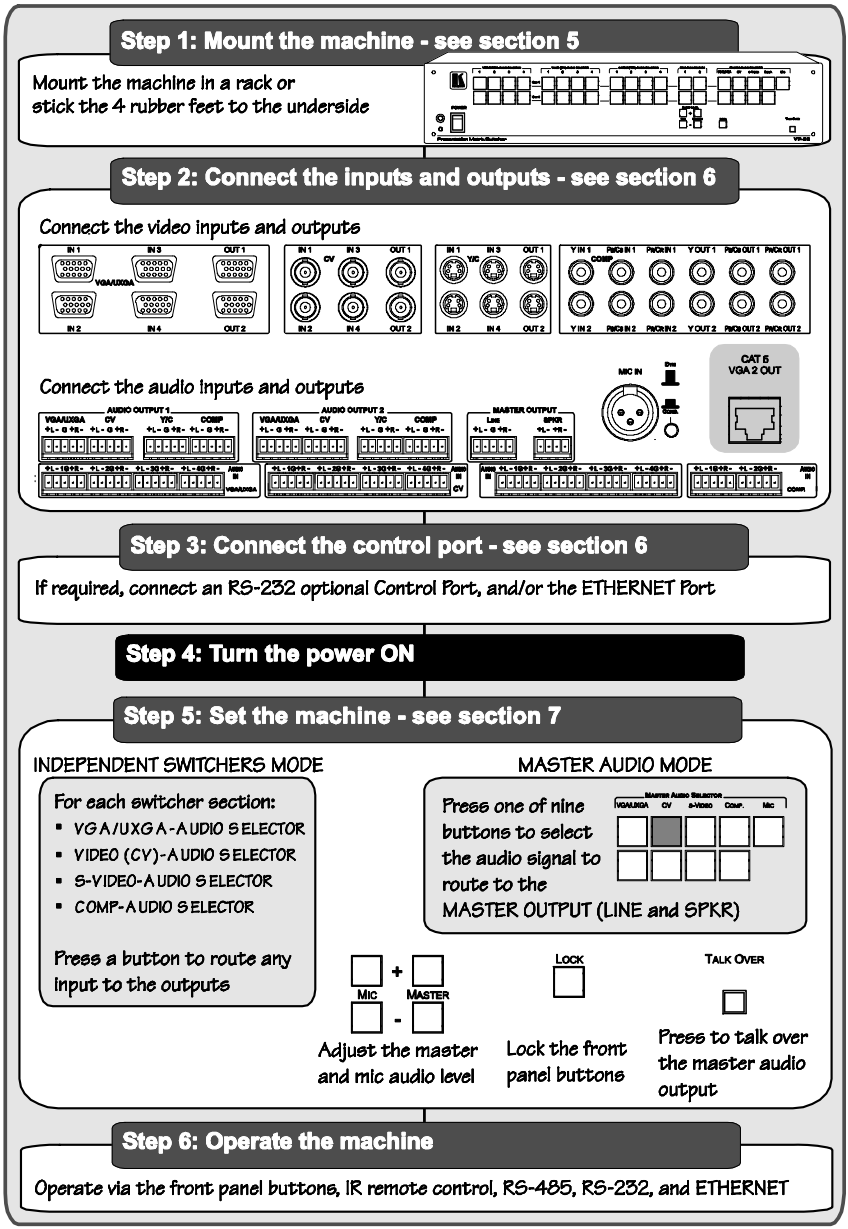
2.1 Quick Start

This quick start chart summarizes the basic setup and operation steps.


Step 1: Mount the machine - see section 5
Mount the machine in a rack or
stick the 4 rubber feet to the underside
Step 2: Connect the inputs and outputs - see section 6
Connect the video inputs and outputs
Connect the audio inputs and outputs
MIC IN
CAT 5
VGA 2 OUT
Step 3: Connect the control port - see section 6
If required, connect an RS-232 optional Control Port, and/or the ETHERNET Port
Step 4: Turn the power ON
Step 5: Set the machine - see section 7
INDEPENDENT SWITCHERS MODE
For each switcher section:
VGA/UXGA-AUDIO SELECTOR
VIDEO (CV)-AUDIO SELECTOR
S-VIDEO-AUDIO SELECTOR
COMP-AUDIO SELECTOR
Press a button to route any input to the outputs
MASTER AUDIO MODE
Press one of nine buttons to select the audio signal to route to the MASTER OUTPUT (LINE and SPKR)
MIC
MASTER
Adjust the master and mic audio level
LOCK
Lock the front panel buttons
TALK OVER
Press to talk over the master audio output
Step 6: Operate the machine
Operate via the front panel buttons, IR remote control, RS-485, RS-232, and ETHERNET

3 Overview

This section describes:

- A summary of the **VP-26**, see section 3.1
- The power connect feature, see section 3.2
- Using shielded twisted pair (STP)/unshielded twisted pair (UTP), see section 3.3
- Recommendations for achieving the best performance, see section 3.4
- The terminology used in this user manual, see section 3.5

3.1 About the VP-26

The **VP-26** is a high quality one-box presentation matrix switcher, which includes three independent 4x2 audio/video matrix switchers, one independent 2x2 audio/video matrix switcher and a master audio switcher. It combines the functions of a 4x2 matrix switcher for computer graphics (VGA/UXGA) signals with audio, a 4x2 matrix switcher for composite video and audio, a 4x2 matrix switcher for s-Video and audio, and a 2x2 matrix switcher for component video (Y, PB/CB, PR/CR) as well as the master audio switcher that routes one of the pre-selected audio inputs (from these four switchers) to two separate outputs.

In addition, the **VP-26** features:

- A VGA/UXGA video bandwidth of 300MHz to ensure transparent performance even in the most critical applications, and is HDTV compatible
- A composite/SDI video bandwidth of 420MHz, an s-Video bandwidth of 320MHz, a component video bandwidth of 380MHz, and a CAT 5 resolution of up to UXGA
- 37 selector buttons, microphone input level control and master audio level control
- Microphone talk-over mode (the microphone input signal lowers the line audio output level when the connected microphone detects sound)
- A CAT 5 output, with a transmission range of more than 300 feet (over 100 meters) that transmits the OUT 2 VGA/UXGA video and audio signals to a remote acceptor via a receiver
- An internal 5-Watt per channel (24kHz, 3dB), stereo power amplifier for connecting the speakers directly to the machine
- A panel LOCK button to prevent tampering with the front panel
- Previous setup recall via the non-volatile memory after power up
- Changing the audio output levels via RS-232 commands

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Control the **VP-26** using the front panel buttons, or remotely via:

- RS-485 or RS-232 serial commands transmitted by a touch screen system, PC, or other serial controller
- The Kramer infrared remote control transmitter
- The ETHERNET

3.2 About the Power Connect™ Feature

The Power Connect feature means that only one unit in a system, the transmitter or the receiver, needs to be connected to a power source when the devices are within 150 feet (50 meters) of each other.

The Power Connect feature applies as long as the cable can carry power. The distance does not exceed 50 meters on standard CAT 5 cable. For longer distances, heavy-gauge cable should be used[1].

For a CAT 5 cable exceeding a distance of 50 meters, separate power supplies should be connected to the transmitter and to the receiver simultaneously.

3.3 Shielded Twisted Pair (STP) / Unshielded Twisted Pair (UTP)

We recommend that you use shielded twisted pair (STP) cable. There are different levels of STP cable available, and we advise you to use the best quality STP cable that you can afford. Our non-skew-free cable, Kramer **BC-STP** is intended for digital signals and for analog signals where skewing is not an issue. For cases where there is skewing, our UTP skew-free cable, Kramer **BC-XTP**, may be used. Bear in mind, though, that we advise using STP cables where possible, since the compliance to electromagnetic interference was tested using those cables.

Although unshielded twisted pair (UTP) cable might be preferred for long range applications, the UTP cable should be installed far away from electric cables, motors and so on, which are prone to create electrical interference. However, since the use of UTP cable might cause inconformity to electromagnetic standards, Kramer does not commit to meeting the standard with UTP cable.

1 CAT 5 cable is still suitable for the video/audio transmission, but not for feeding the power at these distances

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3.4 Recommendations for Achieving the Best Performance

To achieve the best performance:

- Use only good quality connection cables[1] to avoid interference, deterioration in signal quality due to poor matching, and elevated noise levels (often associated with low quality cables).
- Avoid interference from neighboring electrical appliances that may adversely influence signal quality and position your Kramer **VP-26** away from moisture, excessive sunlight and dust

3.5 Terminology Used in this User Manual

Table 1 defines some terms that are used in this user manual.

Table 1: Terminology Used in this User Manual

Term	Definition
802.3	The standard specification for ETHERNET that is maintained by the Institute of Electrical and Electronics Engineers (IEEE).
Dynamic Host Configuration Protocol (DHCP)	Allows the network administrator to distribute IP addresses from a central point and automatically send a new IP address when an Ethernet point is plugged into a different network location.
Gateway	A network position serving as an entry to another network. On the Internet, a node or stopping point can be either a gateway node or a host (end-point) node.
IP Address	A 32-binary digit number that identifies each sender or receiver (within a network via a particular server or workstation) of data (HTML pages or e-mails) that is sent in packets across the Internet. Every device connected to an IP network must have a unique IP address. This address is used to reference the specific unit.
Local Area Network (LAN)	Computers sharing a common communications line or wireless link, which often share a server within a defined geographic area.
Media Access Control (MAC) Address	A computer's unique hardware number (or address) in a LAN or other network. On an Ethernet LAN, the (MAC) address is identical to the Ethernet address.
Transmission Control Protocol/Internet Protocol (TCP/IP)	The basic communication language or protocol of the Internet that breaks the message into appropriately sized packets for the network, and can be used as a communications protocol in an intranet or an extranet.

4 Your Presentation Matrix Switcher

Figure 1, Figure 2, Table 2 and Table 3 describe the front and rear panels of the **VP-26**, respectively.

1 Available from Kramer Electronics on our Web site at http://www.kramerelectronics.com

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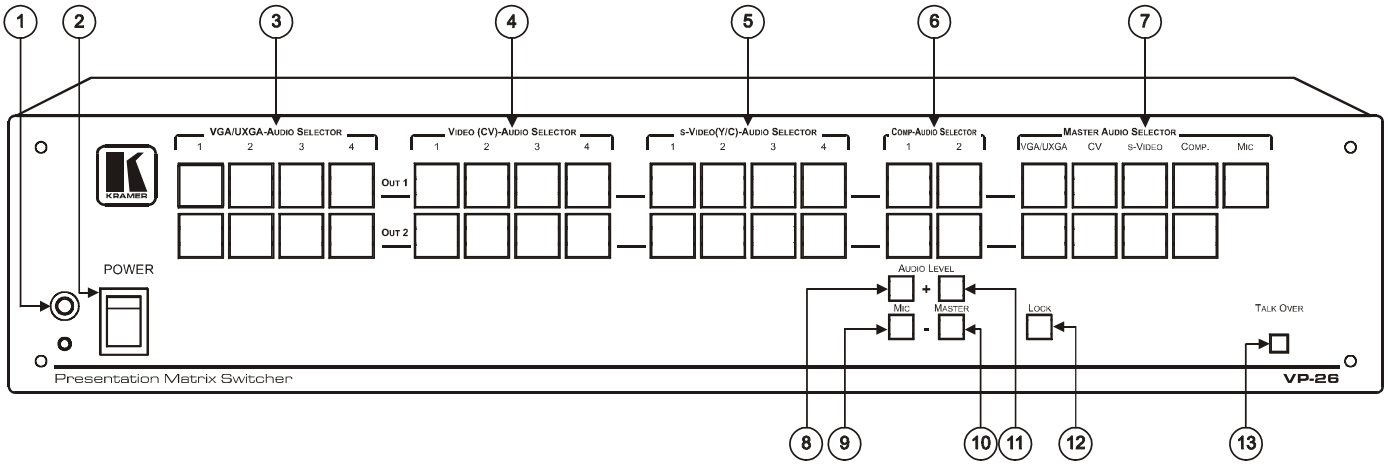

Figure 1: VP-26 Presentation Matrix Switcher – Front View

Table 2: Front Panel VP-26 Presentation Matrix Switcher Features

#	Feature			Function
1	IR (Infrared) Receiver			Signals from the remote control transmitter illuminate the LED
2	*POWER* Switch			Illuminated switch for turning the unit ON and OFF
3	*VGA/UXGA-AUDIO SELECTOR* Buttons			Selects the VGA/UXGA video-audio source to switch to OUT 1 and/or OUT 2 (from 1 to 4)
4	*VIDEO (CV)-AUDIO SELECTOR* Buttons			Selects the composite video-audio source to switch to OUT 1 and/or OUT 2 (from 1 to 4)
5	*s-VIDEO (Y/C)-AUDIO SELECTOR* Buttons			Selects the s-Video-audio source to switch to OUT 1 and/or OUT 2 (from 1 to 4)
6	*COMP-AUDIO SELECTOR* Buttons			Selects the component video-audio source to switch to OUT 1 and/or OUT 2 (input 1 and 2)
7	*MASTER AUDIO SELECTOR*	*VGA/UXGA* Button		Press to route the selected audio signal (OUT 1 or OUT 2) from the VGA/UXGA section to the master audio outputs[1]
		CV Button		Press to route the selected audio signal (OUT 1 or OUT 2) from the composite video section to the master audio outputs[1]
		s-VIDEO Button		Press to route the selected audio signal (OUT 1 or OUT 2) from the s-Video section to the master audio outputs[1]
		COMP. Button		Press to route the selected audio signal (OUT 1 or OUT 2) from the component video section to the master audio outputs[1]
		MIC Button		Press to route the microphone input to the master audio outputs[1]
8	*AUDIO LEVEL*	*MIC*	+ Button	Increase the microphone audio signal level
9			- Button	Decrease the microphone audio signal level
10		*MASTER*	- Button	Decrease the master audio signal level
11			+ Button	Increase the master audio signal level
12	*LOCK* Button			Press to lock the front panel buttons
13	*TALK OVER* Button			Push the button to activate talk over[2]

1 MASTER OUTPUT: LINE and SPEAKER

2 With the TALK OVER button pressed in, speaking into the microphone amplifies the voice of the speaker, overriding and fading out all other audio channels. However, pressing the MIC button in the Master Audio Selector renders the Talk Over function inactive

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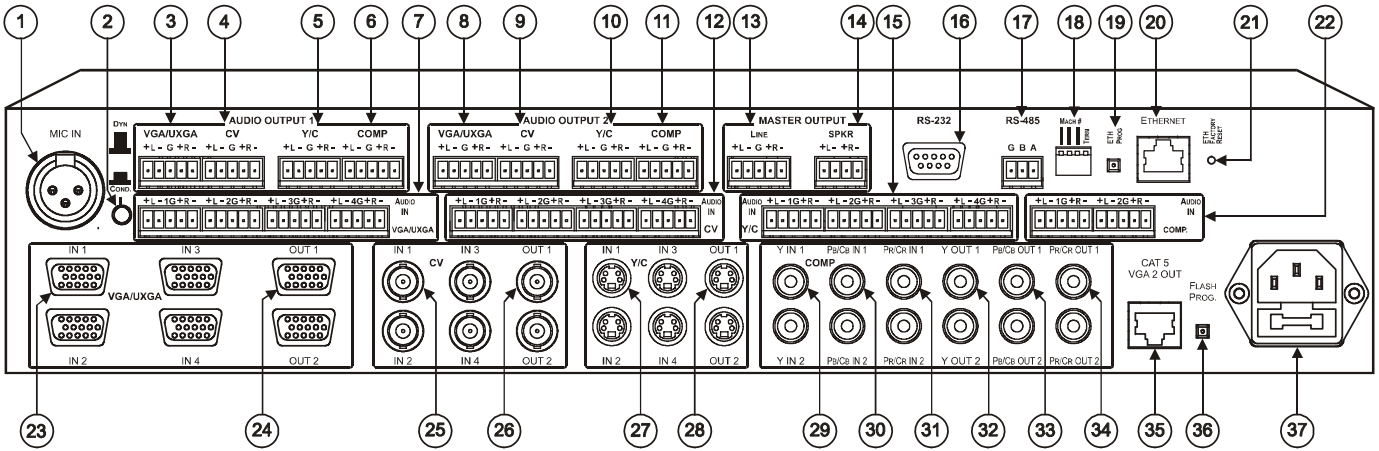

Figure 2: VP-26 Presentation Matrix Switcher – Rear View

Table 3: Rear Panel VP-26 Presentation Matrix Switcher Features

#	Feature		Function
1	*MIC IN* XLR Connector		Connect to the microphone
2	*COND. / DYN* Selector Switch		Push in to select a condenser, release to select a dynamic microphone
3	*AUDIO OUTPUT 1*	*VGA/UXGA* Terminal Block Connector	Connect to a VGA/UXGA balanced audio acceptor
4		*CV* Terminal Block Connector	Connect to a composite video balanced audio acceptor
5		*Y/C* Terminal Block Connector	Connect to an s-Video balanced audio acceptor
6		*COMP* Terminal Block Connector	Connect to a component video balanced audio acceptor
7	*VGA/UXGA AUDIO IN* Terminal Block Connectors		Connect to the VGA/UXGA balanced audio sources[1]
8	*AUDIO OUTPUT 2*	*VGA/UXGA* Terminal Block Connector	Connect to a VGA/UXGA balanced audio acceptor
9		*CV* Terminal Block Connector	Connect to a composite video balanced audio acceptor
10		*Y/C* Terminal Block Connector	Connect to an s-Video balanced audio acceptor
11		*COMP* Terminal Block Connector	Connect to a component video balanced audio acceptor
12	*CV AUDIO IN* Terminal Block Connectors		Connect to the composite video balanced audio sources[1]
13	*MASTER OUTPUT*	*LINE* Terminal Block Connector	Connect the master balanced audio channel acceptor[2]
14		*SPKR* Terminal Block Connector	Connect to a pair of loudspeakers
15	*Y/C AUDIO IN* Terminal Block Connectors		Connect to the s-Video balanced audio sources[1]
16	*RS-232* DB 9F Port		Connects to the PC or the Remote Controller
17	*RS-485* Terminal Block Port		Pins B (-) and A (+) are for RS-485; Pin G may be connected to the shield (if required)
18	DIP-switches		DIP-switches for setup of the unit (DIPs 1, 2 and 3 are for setting the machine # and DIP 4 is for RS-485 termination; see section 6.8)
19	*ETH PROG* Button		Press to upgrade the Ethernet microcontroller firmware (see section 8.2)
20	*ETHERNET* Connector		Connects to the PC or other Serial Controller through computer networking
21	*ETH Factory Reset* Button		Press to reset to factory default definitions[3]: IP Address: 192.168.1.39 Mask: 255.255.255.0 Gateway: 192.168.1.1

1 From 1 to 4

2 Both the LINE and the SPKR terminal block connecters receive the same signal: the LINE outputs it as it is while the SPKR is amplified

3 Turn the machine OFF using the power switch and then turn it ON while pressing the ETH Factory Reset button. The unit will power up and load its memory with the factory default definitions

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#	Feature		Function
22	*COMP AUDIO IN* Terminal Block Connectors		Connect to the component video balanced audio sources[1]
23	*VGA/UXGA*	*IN* HD15 Connectors	Connect to the VGA/UXGA video sources[2]
24		*OUT* HD15 Connectors	Connect to the VGA/UXGA video acceptors[1]
25	*CV*	*IN* BNC Connectors	Connect to the composite video sources[2]
26		*OUT* BNC Connectors	Connect to the composite video acceptors[1]
27	*Y/C*	*IN* 4-pin Connectors	Connect to the s-Video sources[2]
28		*OUT* 4-pin Connectors	Connect to the s-Video acceptors[1]
29	*COMP*	*Y IN* RCA Connectors	Connect to the component (Y, PB/CB, PR/CR) video sources (1 and 2)
30		*PB/CB IN* RCA Connectors	
31		*PR/CR IN* RCA Connectors	
32		*Y OUT* RCA OUT Connectors	Connect to the component (Y, PB/CB, PR/CR) video acceptors (1 and 2)
33		*PB/CB OUT* RCA Connectors	
34		*PR/CR OUT* RCA Connectors	
35	*CAT 5 VGA 2 OUT*[3] *Twisted Pair Connector*		Connect to a remote computer graphics acceptor via a receiver (for example, the **TP-122**[4])
36	*FLASH PROG.* Button		Push in for "Program" to upgrade to the latest Kramer firmware (see section 8), or release for Normal (the factory default)
37	Power Connector with Fuse		AC connector enabling power supply to the unit

Figure 3 and Table 4 define the **VP-26** underside features:

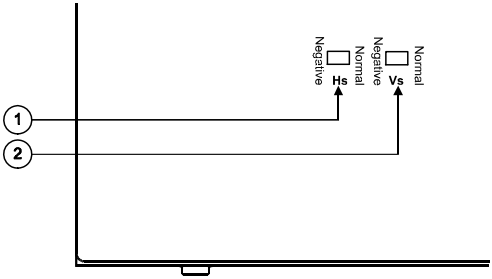

Figure 3: VP-26 Presentation Switcher / Controller – Underside View

Table 4: VP-26 Underside Panel Features

#	Feature	Function
1	HS Switch	Slide the switch to the right (to NORMAL) to retain the polarity Slide the switch to the left[5] to change the HS polarity to NEGATIVE polarity[6]
2	VS Switch	Slide the switch to the right (to NORMAL) to retain the polarity Slide the switch to the left[5] to change the VS polarity to NEGATIVE polarity[6]

1 From 1 to 2

2 From 1 to 4

3 The CAT5 outputs the VGA/UXGA OUT 2 signal only

4 See section 6.1

5 By default, both switches are set to the right

6 Downgoing syncs

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5 Installing the VP-26 on a Rack

This section describes what to do before installing on a rack and how to rack mount.

Before Installing in a rack

Before installing in a rack, be sure that the environment is within the recommended range:	
Operating temperature range	+5° to +45° C (41° to 113° F)
Operating humidity range	10 to 90% RHL, non-condensing
Storage temperature range	-20° to +70° C (-4° to 158° F)
Storage humidity range	5 to 95% RHL, non-condensing

CAUTION!!

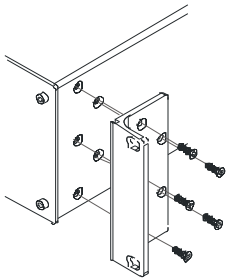
When installing on a 19" rack, avoid hazards by taking care that:

1. It is located within the recommended environmental conditions, as the operating ambient temperature of a closed or multi unit rack assembly may exceed the room ambient temperature.
2. Once rack mounted, enough air will still flow around the machine.
3. The machine is placed straight in the correct horizontal position.
4. You do not overload the circuit(s). When connecting the machine to the supply circuit, overloading the circuits might have a detrimental effect on overcurrent protection and supply wiring. Refer to the appropriate nameplate ratings for information. For example, for fuse replacement, see the value printed on the product label.
5. The machine is earthed (grounded) in a reliable way and is connected only to an electricity socket with grounding. Pay particular attention to situations where electricity is supplied indirectly (when the power cord is not plugged directly into the socket in the wall), for example, when using an extension cable or a power strip, and that you use only the power cord that is supplied with the machine.

How to Rack Mount

To rack-mount a machine:

1. Attach both ear brackets to the machine. To do so, remove the screws from each side of the machine (3 on each side), and replace those screws through the ear brackets.



2. Place the ears of the machine against the rack rails, and insert the proper screws (not provided) through each of the four holes in the rack ears.

Note that:

- **In some models, the front panel may feature built-in rack ears**
- Detachable rack ears can be removed for desktop use
- Always mount the machine in the rack before you attach any cables or connect the machine to the power
- If you are using a Kramer rack adapter kit (for a machine that is not 19"), see the Rack Adapters user manual for installation instructions (you can download it at: http://www.kramerelectronics.com)

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6 Connecting the VP-26 Presentation Matrix Switcher

This section describes how to:

- Connect the rear panel (see section 6.1)
- Connect the audio (see section 6.2)
- Wire the CAT 5 connector (see section 6.3)
- Connect a PC or other controller via the RS-232 port (see section 6.4)
- Connect a controller via the RS-485 port (see section 6.5)
- Control via the ETHERNET (see section 6.6)
- Cascade several machines (see section 6.7)
- Set the DIP-switches (see section 6.8)

6.1 Connecting the VP-26 Rear Panel

To connect[1] the **VP-26**, as the example[2] illustrated in Figure 4 shows[3], do the following[4]:

1. Connect the following video sources, that is, one[5]:
   - VGA/UXGA source (for example, a computer graphics source) to the VGA/UXGA IN 1 15-pin HD (F) connector
   - Composite video source (for example, a composite video player) to the CV IN 1 BNC connector
   - s-Video source (for example, an s-Video player) to the Y/C IN 1 4-pin connector
   - Component video source (for example, a DVD player) to the three IN 1 RCA connectors Y, Pb/Cb and Pr/Cr
2. Connect the OUT 1 acceptors to a projector[6] as follows:
   - The composite video CV OUT BNC connector to the composite video input of the projector
   - The s-Video Y/C OUT 4-pin connector to the s-Video input of

1 You do not need to connect all the inputs

2 In this example, each of the OUT 1 connectors (one from each group) is connected to the same projector. Use the projector controller to switch between the VP-26 video outputs (or projector inputs)

3 In Figure 4, the audio connections are not shown, except for the microphone and speakers connections

4 Switch OFF the power on each device before connecting it to your VP-26. After connecting your VP-26, switch on its power and then switch on the power on each device. Switching on the VP-26, recalls the previous setup from the non-volatile memory

5 Although in this example only one source is connected, you can connect all four inputs, that is, 12 in total

6 In this example a projector is used, but you can also connect separate outputs such as displays, video recorders and so on

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the projector

- The VGA/UXGA UXGA OUT 15-pin HD (F) connector to the VGA/UXGA input of the projector
- The three OUT RCA connectors Y, PB/CB and PR/CR to the component video input of the projector

3. Connect the appropriate balanced audio sources and acceptors (not shown in Figure 4[1]).
4. Connect the MASTER OUTPUT LINE terminal block connector, if required (not shown in Figure 4; see section 7.3).
5. Connect the MASTER OUTPUT SPKR block connector to a pair of loudspeakers, by connecting the left loudspeaker to the "L+" and the "L-" terminal block connectors, and the right loudspeaker to the "R+" and the "R-" terminal block connectors. **Do not Ground the loudspeakers**.
6. Connect the CAT 5 VGA 2 OUT twisted pair connector (see section 6.3) to a line receiver (for example, the **TP-122** *XGA / Audio Line Receiver*[2], which is connected to a remote display and speakers).
7. Connect a dynamic or a condenser microphone[3], if required, to the MIC IN XLR connector.
8. You can connect a PC and/or controller to the:
   - RS-232 port (see section 6.4)
   - RS-485 port (see section 6.5)
   - ETHERNET (see section 6.6)
9. Connect the unit to additional machines (if required) via the RS-485 port (see section 6.7) for control.
10. Connect the power cord.

1 In Figure 4, the audio connections are not shown, except for the microphone and speakers connections

2 The receiver receives the CAT5 signal, decodes it and outputs it to a VGA acceptor

3 Use the Con/Dyn switch (refer to the rear panel, item 2 in Figure 2) to select a dynamic microphone or a condenser

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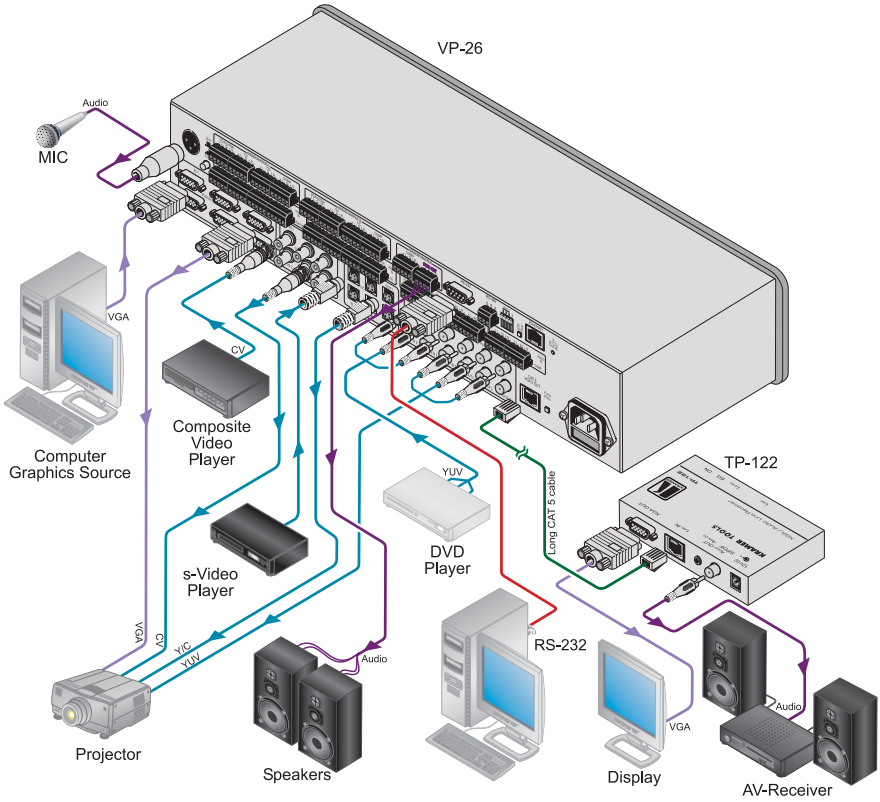


Figure 4: Connecting the VP-26 Presentation Matrix Switcher

6.2 Connecting the Balanced/Unbalanced Stereo Audio Input/Output

Figure 5, Figure 6, and Figure 7 illustrate how to wire a balanced / unbalanced input and/or output connection:

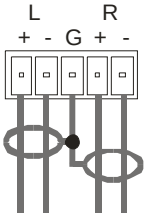


Figure 5: Connecting a Balanced Stereo Audio Input/Output

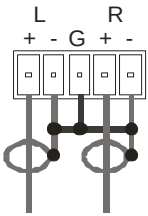


Figure 6: Connecting an Unbalanced Stereo Audio Input

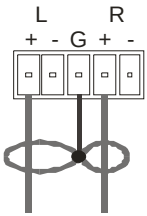


Figure 7: Connecting an Unbalanced Stereo Audio Output

6.3 Wiring the CAT 5 LINE OUT RJ-45 Connector

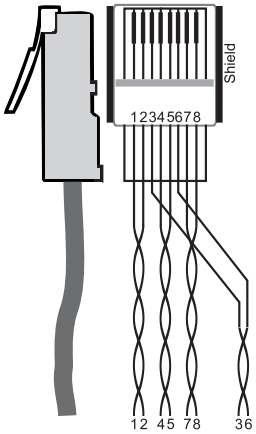
Table 5 and Figure 8 define the CAT 5 PINOUT, using a straight pin-to-pin cable with RJ-45 connectors:

Table 5: CAT 5 PINOUT

EIA /TIA 568A	
PIN	**Wire Color**
1	Green / White
2	Green
3	Orange / White
4	Blue
5	Blue / White
6	Orange
7	Brown / White
8	Brown
Pair 1	4 and 5
Pair 2	3 and 6
Pair 3	1 and 2
Pair 4	7 and 8

EIA /TIA 568B	
PIN	**Wire Color**
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown
Pair 1	4 and 5
Pair 2	1 and 2
Pair 3	3 and 6
Pair 4	7 and 8

Figure 8: CAT 5 PINOUT



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6.4 Connecting a PC

You can connect a PC (or other controller) to the **VP-26** via the RS-232 port.

To connect using the null-modem adapter provided with the machine (recommended method):

- Connect the RS-232 9-pin D-sub rear panel port on the **VP-26** to the null-modem adapter and connect the null-modem adapter with a 9-wire flat cable to the RS-232 9-pin D-sub port on your PC

To connect without using a null-modem adapter:

- Connect the RS-232 9-pin D-sub port on your PC to the RS-232 9-pin D-sub rear panel port on the **VP-26**, as Figure 9 illustrates

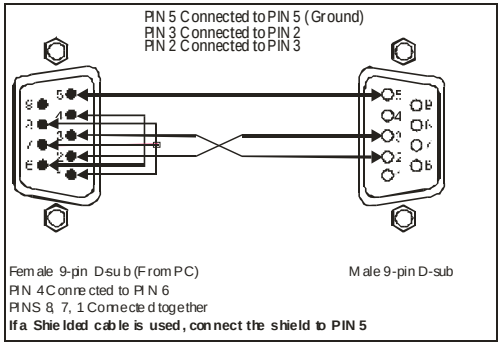
PIN 5 Connected to PIN 5 (Ground)
PIN 3 Connected to PIN 2
PIN 2 Connected to PIN 3
Female 9-pin D-sub (From PC)
Male 9-pin D-sub
PIN 4 Connected to PIN 6
PINS 8, 7, 1 Connected together
If a Shielded cable is used, connect the shield to PIN 5

Figure 9: Connecting a PC Without a null-modem Adapter

6.5 Connecting via RS-485

You can control a **VP-26** unit via an RS-485 controller, or a Master Programmable Remote Control system such as the Kramer **RC-3000**.

To connect an **RC-3000** to a **VP-26** unit (see Figure 10), connect the RS-485 terminal block port on the **RC-3000** to the RS-485 port on the **VP-26** unit, as follows:

- Connect the “A” (+) PIN on the RS-485 rear panel port of the **RC-3000** to the “A” (+) PIN on the RS-485 rear panel port of the **VP-26** unit
- Connect the “B” (-) PIN on the RS-485 rear panel port of the **RC-3000** to the “B” (-) PIN on the RS-485 rear panel port of the **VP-26** unit
- If shielded twisted pair cable is used, the shield may be connected to the “G” (Ground) PIN on one of the units (for example, on the **RC-3000**)

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- Set the **VP-26** unit to a Machine # other than 1, according to Table 7, and set DIP 4 ON (for RS-485 line termination with 120Ω)

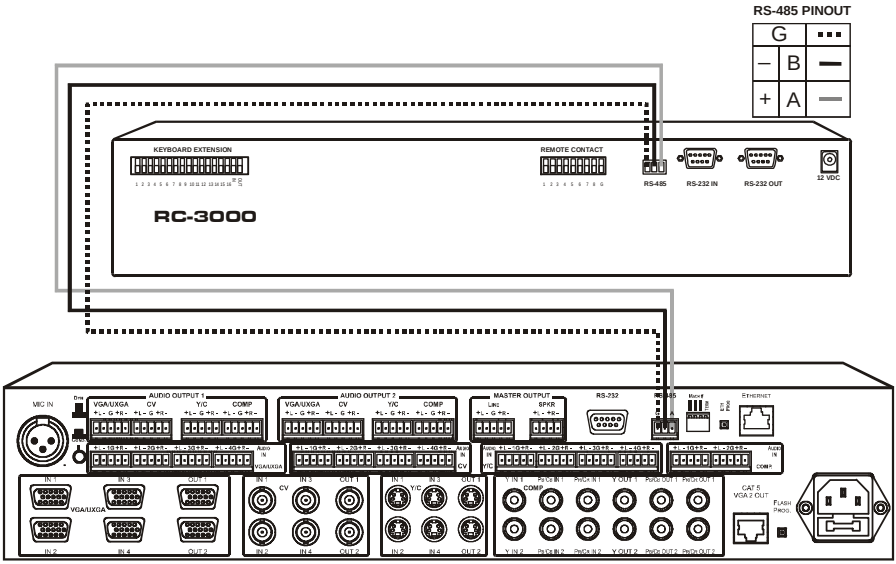

Figure 10: Controlling via RS-485 (for example, using an RC-3000)

6.6 Controlling via ETHERNET

You can connect the **VP-26** via the Ethernet, using a crossover cable (see section 6.6.1) for direct connection to the PC or a straight through cable (see section 6.6.2) for connection via a network hub or network router[1].

6.6.1 Connecting the ETHERNET Port Directly to a PC (Crossover Cable)

You can connect the Ethernet port of the **VP-26** to the Ethernet port on your PC, via a crossover cable with RJ-45 connectors.

This type of connection is recommended for identification of the factory default IP Address of the **VP-26** during the initial configuration

After connecting the Ethernet port, configure your PC as follows:

1. Right-click the My Network Places icon on your desktop.

1 After connecting the Ethernet port, you have to install and configure your Ethernet Port. For detailed instructions, see the "Ethernet Configuration (FC-11) guide.pdf" file in the technical support section on our Web site: http://www.kramerelectronics.com

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2. Select **Properties**.
3. Right-click Local Area Connection Properties.
4. Select **Properties**.
   The Local Area Connection Properties window appears.
5. Select the Internet Protocol (TCP/IP) and click the **Properties** Button (see Figure 11).

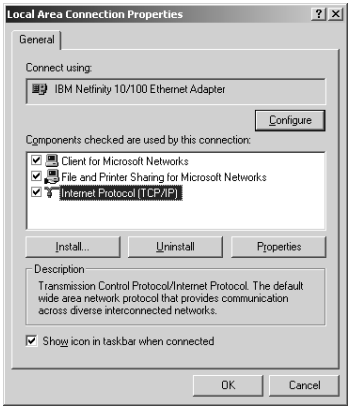

Figure 11: Local Area Connection Properties Window

6. Select Use the following IP Address, and fill in the details as shown in Figure 12.
7. Click **OK**.

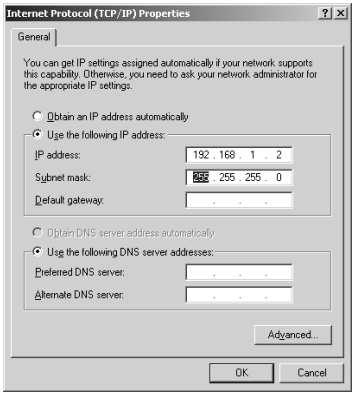
Internet Protocol (TCP/IP) Properties
General
You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.
Obtain an IP address automatically
Use the following IP address:
IP address:
192 . 168 . 1 . 2
Subnet mask:
255 . 255 . 255 . 0
Default gateway:
Obtain DNS server address automatically
Use the following DNS server addresses:
Preferred DNS server:
Alternate DNS server:
Advanced...
OK
Cancel

Figure 12: Internet Protocol (TCP/IP) Properties Window

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6.6.2 Connecting the ETHERNET Port via a Network Hub (Straight-Through Cable)

You can connect the Ethernet port of the **VP-26** to the Ethernet port on a network hub or network router, via a straight-through cable with RJ-45 connectors.

6.6.3 Control Configuration via the Ethernet Port

To control several units via the Ethernet, connect the Master unit (Machine # 1) via the Ethernet port to the LAN port of your PC. Use your PC initially to configure the settings (see section 6.6).

6.7 Controlling via RS-232 and RS-485

You can cascade up to eight **VP-26** units with control from a PC or serial controller.

To cascade up to eight individual **VP-26** units, via RS-232 and RS-485, as illustrated in Figure 13, do the following:

1. Connect the video sources and acceptors, as well as the appropriate audio sources and acceptors, as described in section 6.1.
2. Connect the RS-232 port on the first **VP-26** unit to the PC using the null-modem adapter provided with the machine (recommended), as section 6.4 describes.
3. Connect the RS-485 terminal block port on the first **VP-26** unit to the RS-485 port on the second **VP-26** unit and so on, connecting all the RS-485 ports.
4. Set the DIP-switches, as section 6.8.1 describes. In particular:
   - Set the first **VP-26** unit as Machine # 1, the second unit to Machine # 2, and so on - up to Machine # 8 for the eighth unit
   - Set Dip 4 ON on the first and last **VP-26** units (terminating the RS-485 line at 120Ω). On the other units, set DIP 4 OFF

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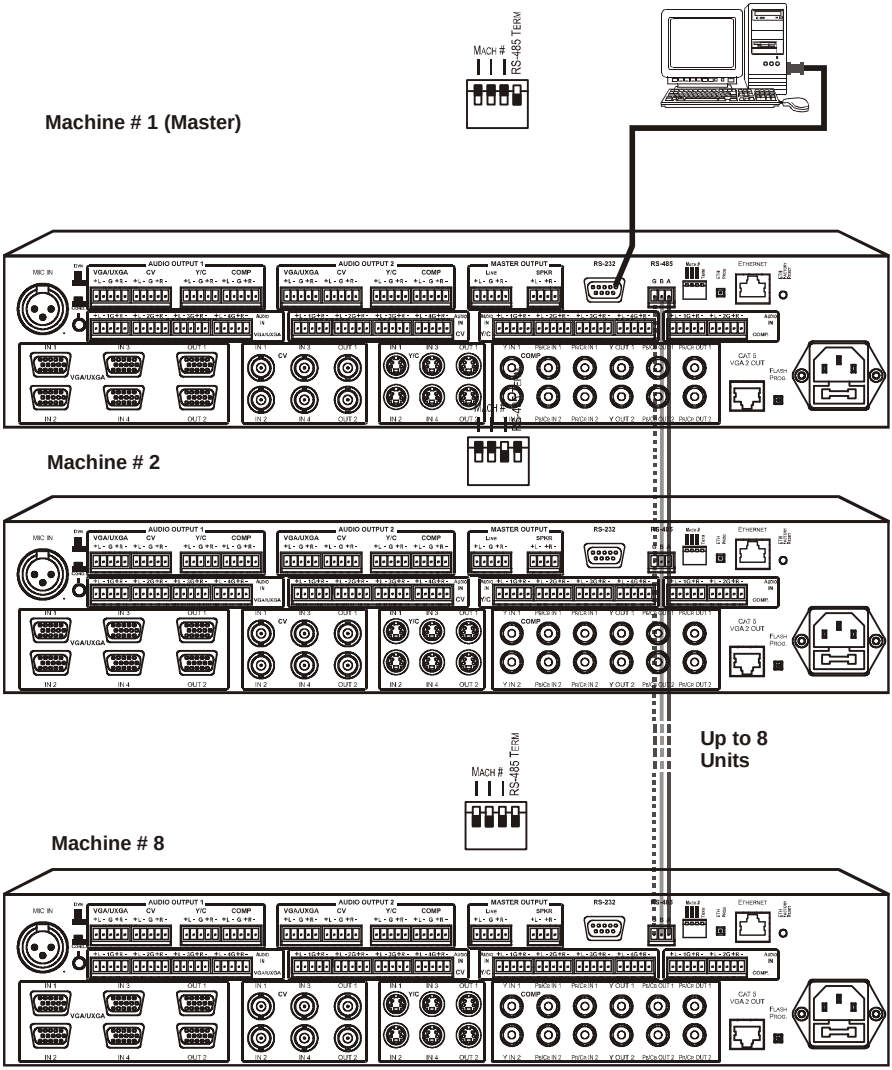

Figure 13: Control Configuration via RS-232 and RS-485

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6.8 DIP-Switch Settings

Figure 14 and Table 6 define the factory default DIP-switch settings[1]:

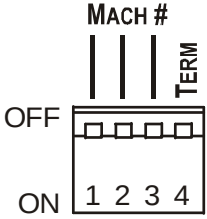

Figure 14: Default DIP-switch Settings

Table 6: DIP-switch Settings

DIPS	Function	Description
1, 2, 3	Machine #	Determines the number of the machine in the sequence
4	RS-485 TERM	ON for RS-485 Line Termination with 120Ω; OFF for no RS-485 Line Termination

6.8.1 Setting the Machine # DIP-Switches

You can cascade up to eight **VP-26** units. The Machine # determines the position of a **VP-26** unit, specifying which **VP-26** unit is being controlled when several **VP-26** units connect to a PC or serial controller. Set the Machine # on a **VP-26** unit via Setup DIPS 1, 2 and 3, according to Table 7.

Table 7: Machine # DIP-switch Settings

Machine #	DIP-switch		
	1	2	3
1 Master	OFF	OFF	OFF
2	OFF	OFF	ON
3	OFF	ON	OFF
4	OFF	ON	ON
5	ON	OFF	OFF
6	ON	OFF	ON
7	ON	ON	OFF
8	ON	ON	ON

1 By default, all dipswitches are set to OFF

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7 Operating Your Switcher

This section describes the:

- Front panel buttons (see section 7.1)
- Independent switchers AFV mode (see section 7.2)
- Master audio breakaway mode (see section 7.3)

7.1 The Front Panel Buttons

The front panel buttons include:

- Two sets of four (from 1 to 4) VGA/UXGA-AUDIO SELECTOR buttons for switching to OUT 1 and/or OUT 2
- Two sets of four (from 1 to 4) VIDEO (CV)-AUDIO SELECTOR buttons for switching OUT 1 and/or OUT 2
- Two sets of four (from 1 to 4) S-VIDEO (Y/C)-AUDIO SELECTOR buttons for switching to OUT 1 and/or OUT 2
- Two sets of two (1 and 2) COMP-AUDIO SELECTOR buttons for switching to OUT 1 and/or OUT 2
- Nine MASTER AUDIO SELECTOR buttons (two sets of VGA/UXGA, CV, S-VIDEO and COMP for OUT 1 and OUT 2 signals, and MIC)
- MIC AUDIO LEVEL up and down buttons to adjust the level at the master audio out[1] connectors[2] and the talk-over function threshold[3]
- MASTER AUDIO LEVEL up and down buttons to adjust the audio output level at the master audio out connectors[1], without influencing any other audio output
- Panel LOCK button to lock the front panel buttons
- TALK OVER button[4], which lowers or mutes the MASTER AUDIO LEVEL when the microphone picks up speech[5]

1 MASTER OUT and SPKR OUT

2 Useful in the TALK OVER mode, when the microphone level needs to be adjusted separately

3 Achieving optimum results for a particular environment when using a microphone may require experimentation in adjusting the AUDIO and MIC LEVELS

4 Two channels are active in the Talk Over mode, a source selected via the MASTER AUDIO SELECTOR buttons and the microphone channel

5 Adjust the microphone level via the MIC AUDIO LEVEL + and - buttons

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By default[1], the stereo audio signals switch together with the video, that is, the unit is set in an AFV[2] mode. You can change to breakaway mode[3], via RS-232

Pressing an illuminated AUDIO SELECTOR button for more than 2 seconds mutes the master audio output, and the button no longer illuminates. The video will continue to display but without sound.

7.2 The Independent Switchers AFV Mode

In the independent switchers AFV mode, the four matrix switchers of the **VP-26** operate independently of each other. For each matrix switcher, you can select any input to switch to the outputs, as illustrated in Figure 15.

The audio input signal follows the video signal and the last audio signal selected is outputted to the master audio output

You can route any combination of:

- Two of the four VGA/UXGA inputs to the VGA/UXGA[4] outputs
- Two of the four CV inputs to the CV outputs
- Two of the four Y/C inputs to the Y/C outputs
- The COMP inputs to the COMP outputs

For example[5], in the CV matrix switcher section, you can switch IN 1 to OUT 1 and IN 4 to OUT 2 by pressing the VIDEO (CV)-AUDIO SELECTOR button 1 on the OUT 1 set, and button 4 on the OUT 2 set.

The same applies to the other matrix switcher sections (CV, Y/C and COMP).

Each pressed button illuminates[6], indicating selection and outputting of that video and audio source.

You can choose not to use one or more of the matrix switchers

1 This is, the pre-installed factory default. The default can be modified via the Windows®-based Kramer control software

2 Audio-Follow-Video, in which all operations relate to both the video and the audio channels

3 In which video and audio channels switch independently

4 The OUT 2 signal is also routed to the CAT5 VGA 2 OUT connector

5 Assuming that all inputs are connected

6 Pressing an illuminated button for more than 2 seconds will disconnect the output and the button will no longer illuminate

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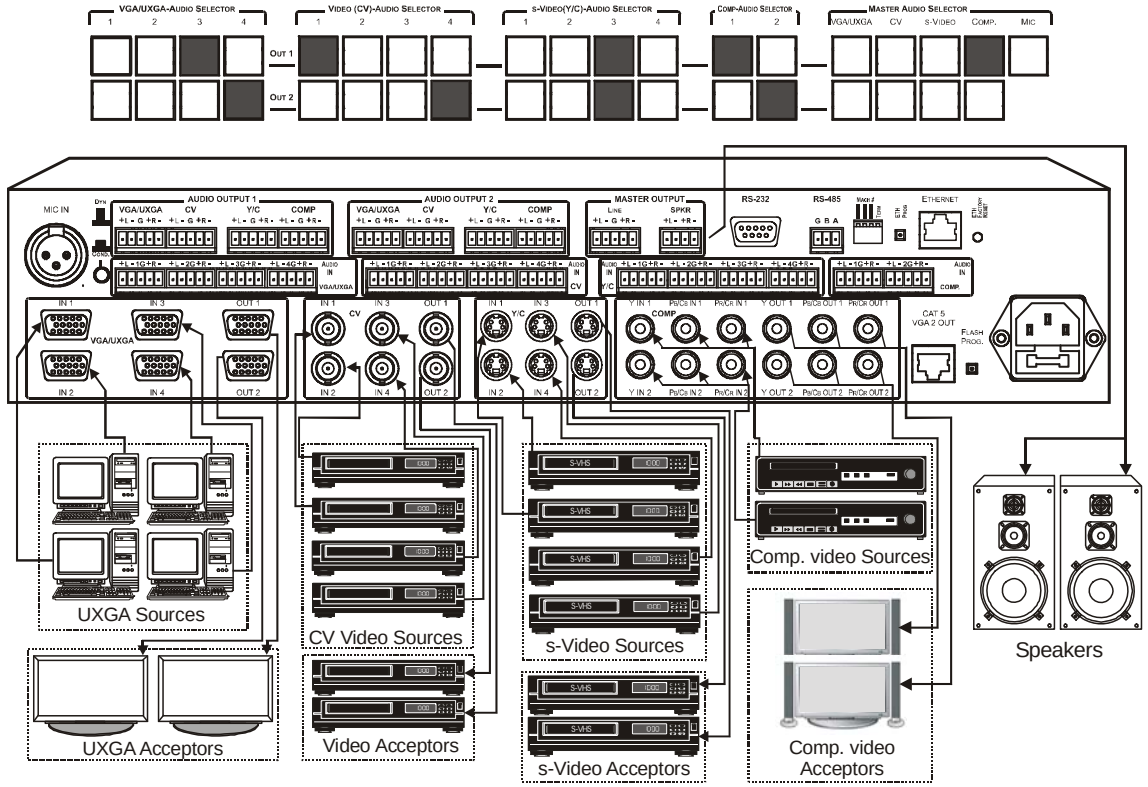

Figure 15: Independent Switchers Mode

7.3 The Master Audio Breakaway Mode

The Master Audio automatically follows the last input selected[1] (for example, COMP OUT 1 in Figure 15), regardless of the switcher group (VGA, s-Video, composite video or component video), and the respective button[2] under the MASTER AUDIO SELECTOR section illuminates, indicating that the selected input (for example, COMP OUT 1 in Figure 15) is routed to the master outputs.

In the Master Audio Breakaway mode[3], switching a video input will not switch the respective audio signal. You can independently route an audio input signal from any of the A/V matrix switchers or from the microphone, to the MASTER OUTPUT LINE[4] and/or SPKR[4] outputs, regardless of the video input last selected. You can change the audio input switched to the master output by pressing the relevant button under the MASTER AUDIO SELECTOR section[5]. For example, press the CV OUT 2 button under the MASTER AUDIO SELECTOR section to route the composite video input 4 signal to the MASTER OUTPUT, as illustrated in Figure 16:

Figure 16: Switching in the Master Audio Mode

When a microphone is connected to the MIC IN XLR connector, you can press the MIC button under the MASTER AUDIO SELECTOR section. The MIC button illuminates (see Figure 17) and the speakers output the MIC IN[6] audio signal, while retaining the current video display. You can return to the composite video (CV) audio output by pressing the relevant CV button under the MASTER AUDIO SELECTOR section once again.

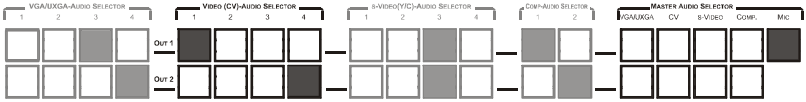

Figure 17: Switching to the MIC in the Master Audio Mode

1 The Independent Switchers AFV mode

2 Replacing the previous illuminated button

3 You can set the machine to the breakaway mode via RS-232

4 The MASTER audio signal is routed simultaneously to the LINE and the SPKR channels. The only difference between them is that the SPKR channel has an internal power amplifier, which lets you connect the speakers directly to the unit

5 The nine MASTER AUDIO SELECTOR buttons include one button for each of the outputs and the MIC button

6 Another way to use the microphone is to press the TALK OVER button: the main audio level is lowered when the microphone picks up speech

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8 Flash Memory Upgrade

The **VP-26** lets you upgrade both the:

- Switcher Microcontroller (see section 8.1)
- Ethernet Microcontroller (see section 8.2)

8.1 Switcher Flash Memory Upgrade

The **VP-26** firmware is located in FLASH memory, which lets you upgrade to the latest Kramer firmware version in minutes! The process involves:

- Downloading from the Internet (see section 8.1.1)
- Connecting the PC to the RS-232 port (see section 8.1.2)
- Upgrading Firmware (see section 8.1.3)

8.1.1 Downloading from the Internet

You can download the up-to-date file[1] from the Internet. To do so:

1. Go to our Web site at http://www.kramerelectronics.com and download the file: "*FLIP_VP26.zip*" from the Technical Support section.
2. Extract the file: "*FLIP_VP26.zip*" to a folder (for example, C:\Program Files\Kramer Flash).
3. Create a shortcut on your desktop to the file: "*FLIP.EXE*".

8.1.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer firmware version on a **VP-26** unit, do the following:

1. Connect the RS-232 9-pin D-sub rear panel port on the **VP-26** unit to the null-modem adapter and connect the null-modem adapter with a 9-wire flat cable to the RS-232 9-pin D-sub COM port on your PC (see section 6.4).
2. On the rear panel, push in the FLASH PROG. button (to program), using a screwdriver.
3. Connect the power on the **VP-26** unit and switch it ON.
4. On the rear panel, push in the FLASH PROG. (see Figure 2), using a screwdriver.

1 The files indicated in this section are given as an example only. These file names are liable to change from time to time

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8.1.3 Upgrading Firmware

Follow these steps to upgrade the firmware:

1. Double click the desktop icon: "*Shortcut to FLIP.EXE*".
   The Splash screen appears as follows:

Figure 18: Splash Screen

2. After a few seconds, the Splash screen is replaced by the "*Atmel – Flip*" window:

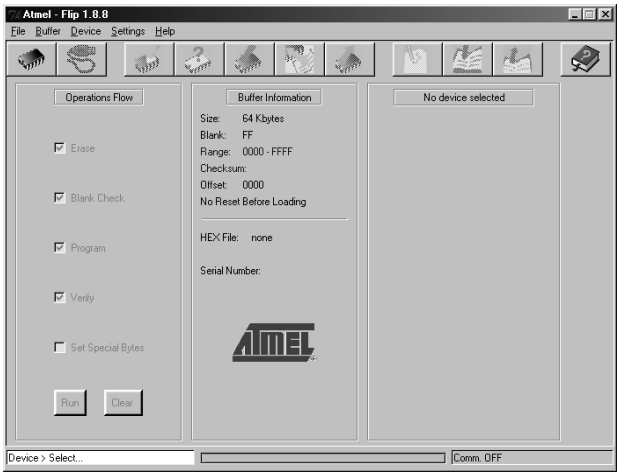

Figure 19: Atmel – Flip Window

3. Press the keyboard shortcut key *F2* (or select the "*Select*" command from the *Device* menu, or press the integrated circuit icon in the upper right corner of the window).
   The "*Device Selection*" window appears:

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Figure 20: Device Selection Window

4. Click the button next to the name of the device and select from the list: AT89C51RD2:

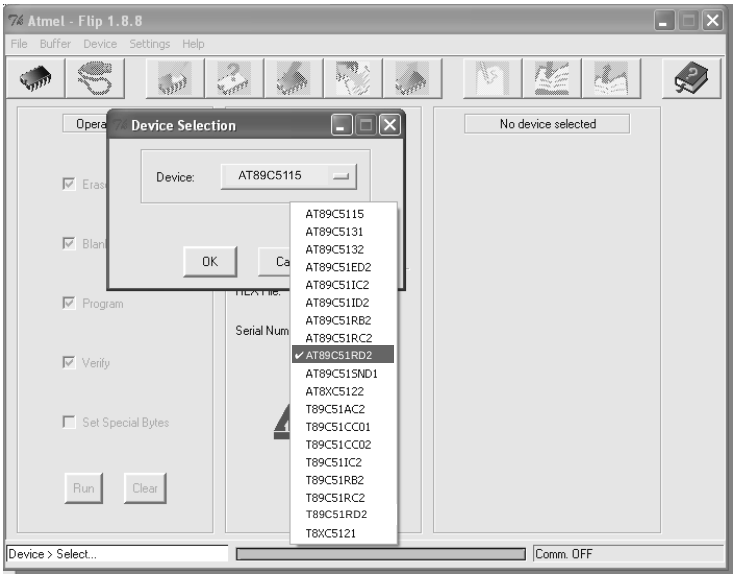

Figure 21: Selecting the Device from the Selection Window

5. Click OK and select "*Load Hex*" from the *File* menu.

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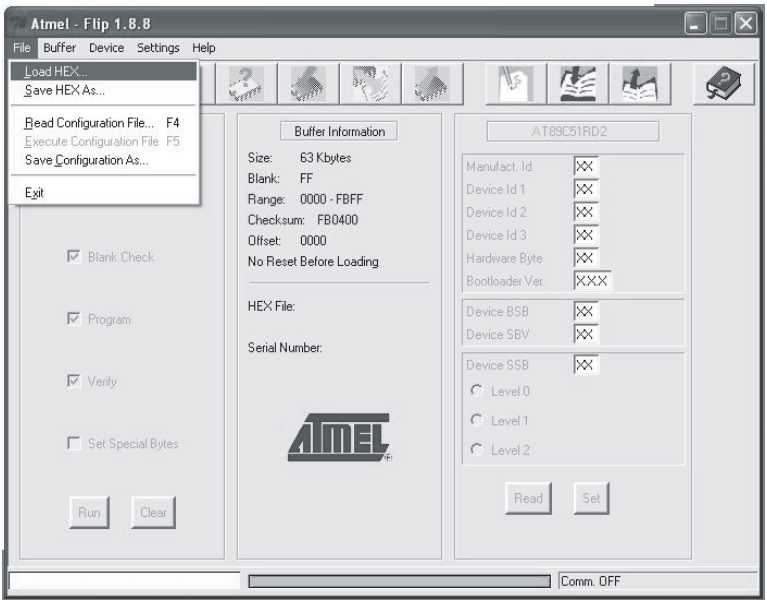

Figure 22: Loading the Hex

6. The Open File window opens. Select the correct HEX file that contains the updated version of the firmware for **VP-26** (for example, ***26M_V1p2.hex***) and click Open.
7. Press the keyboard shortcut key *F3* (or select the "*Communication / RS232*" command from the *Settings* menu, or press the keys: *Alt SCR*).
   The "*RS232*" window appears. Change the COM port according to the configuration of your computer and select the 9600 baud rate:

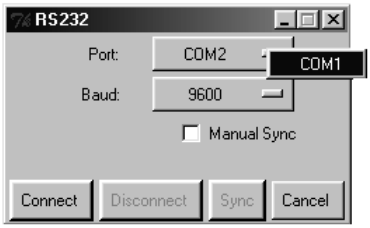

Figure 23: RS-232 Window

8. Click Connect.
   In the "*Atmel – Flip*" window, in the *Operations Flow* column, the *Run* button is active, and the name of the chip appears as the name of the third column: *AT89C51RD2*.

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Verify that in the *Buffer Information* column, the "*HEX File: VP26.hex*" appears.

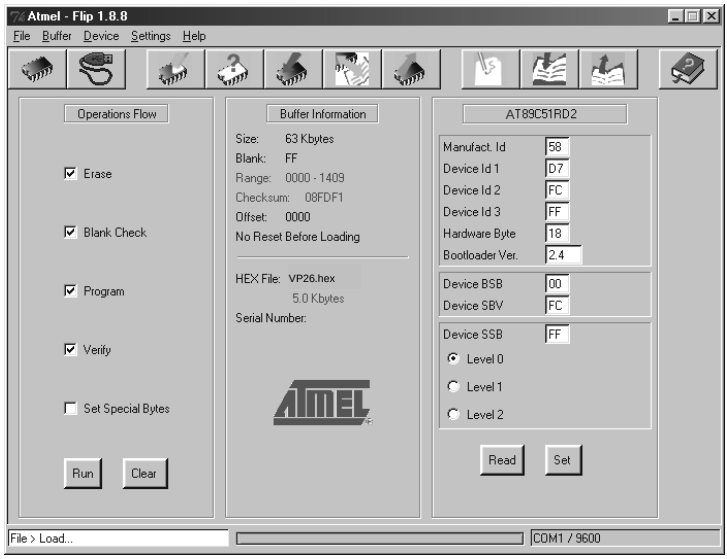

Figure 24: Atmel – Flip Window (Connected)

9. Click *Run*.
   After each stage of the operation is completed, the check-box for that stage becomes colored green[1].
   When the operation is completed, all 4 check-boxes will be colored green and the status bar message: *Memory Verify Pass* appears[2]:

1 See also the blue progress indicator on the status bar

2 If an error message: "Not Finished" shows, click Run again

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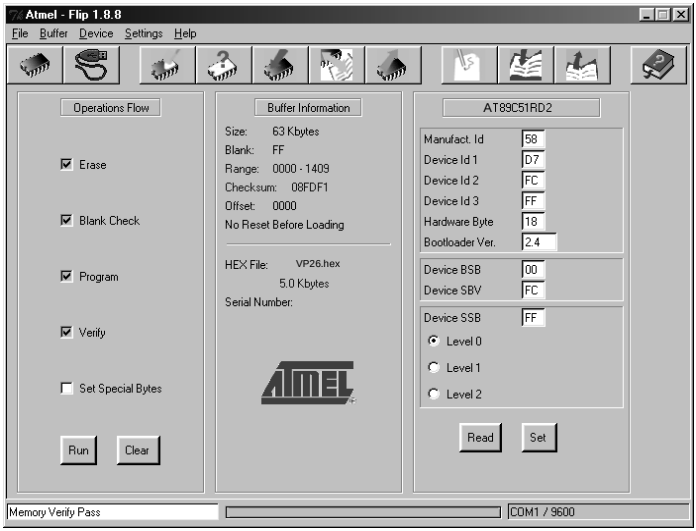

Figure 25: Atmel – Flip Window (Operation Completed)

10. Close the "*Atmel – Flip*" window.
11. Disconnect the power on the **VP-26**.
12. Disconnect the *RS-232* rear panel port on the **VP-26** unit from the null-modem adapter.
13. Release the FLASH PROG. button on rear panel.
14. Connect the power to the **VP-26**.

8.2 Ethernet Flash Memory Upgrade

The **VP-26** firmware is located in FLASH memory, which lets you upgrade to the latest Kramer firmware version in minutes!

The process involves:

- Downloading the upgrade package from the Internet
- Connecting the PC to the RS-232 port
- Upgrading the firmware

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8.2.1 Downloading from the Internet

You can download the up-to-date file[1] from the Internet. To do so:

1. Go to our Web site at http://www.Kramerelectronics.com and download the file: "*SetKFRETH11-xx.zip*" from the technical support section.
2. Extract the file "*SetKFRETH11-xx.zip*" package, which includes the KFR-Programmer application setup and the *.s19* firmware file, to a folder (for example, C:\Program Files\KFR Upgrade).
3. Install the KFR-Programmer Application.

8.2.2 Connecting the PC to the RS-232 Port

Before installing the latest Kramer Ethernet firmware version on the **VP-26**, do the following:

1. Connect the RS-232 9-pin D-sub port (COM 1) on the **VP-26** to a null-modem adapter and connect the null-modem adapter with a 9-wire flat cable to the RS-232 9-pin D-sub COM port on your PC.
2. Push in the ETH PROG button, located on the machine rear side.
3. Connect the power on your machine.

8.2.3 Upgrading Firmware

Follow these steps to upgrade the firmware:

1. Double click the KFR-Programmer desktop icon.
   The KFR-Programmer window appears (see Figure 26).

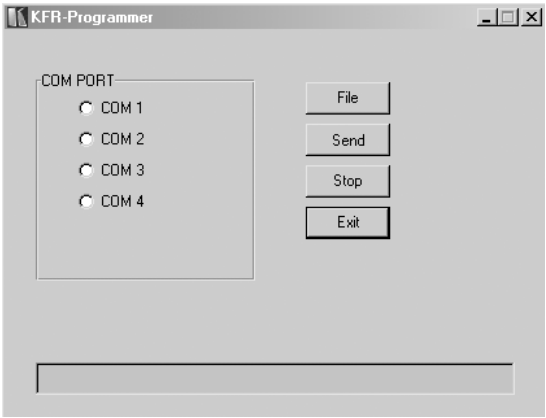

Figure 26: The KFR-Programmer Window

1 File names are liable to change from time to time

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2. Select the required COM Port[1].
3. Press the File button to select the *.s19* firmware file included in the package.
4. Press the Send button to download the file. The Send button lights red.
5. Wait until downloading is completed and the red Send button turns off.
6. Disconnect the power on the **VP-26**.
7. Release the ETH PROG button, located on the machine rear side.
8. Connect the power on your machine.

1 To which the VP-26 is connected on your PC

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9 Technical Specifications

Table 8 includes the technical specifications[1]:

Table 8: Technical Specifications of the VP-26 Presentation Switcher

INPUTS:	4 VGA/UXGA on 15-pin HD (F) connectors 4 s-Video, 1 Vpp (Y), 0.3Vpp (C) / 75 Ω on 4-pin connectors 4 composite video 1Vpp / 75 Ω on BNC connectors 2 sets of component video (Y, Pb/Cb, Pr/Cr) 1Vpp, 0.7Vpp, 0.7Vpp on RCA connectors Each input is accompanied by the appropriate balanced stereo-audio channels: +4dBm / 50 kΩ on detachable terminal block connectors Mic: 3mV / 10 kΩ condenser / dynamic on an XLR connector	
OUTPUTS:	2 VGA/UXGA on 15-pin HD (F) connectors 2 s-Video - 1 Vpp (Y), 0.3Vpp (C), / 75 Ω on 4-pin connectors 2 composite video 1 Vpp / 75 Ω on BNC connectors 2 sets of component video (Y, Pb/Cb, Pr/Cr) 1Vpp, 0.7Vpp, 0.7Vpp on RCA connectors 1 UTP CAT 5 connector (Line OUT) Each output is accompanied by the appropriate balanced stereo-audio channel: +4dBm / 150 Ω on detachable terminal blocks 1 master stereo audio +4dBm / 150 Ω on a detachable terminal block 1 stereo speaker output 2x5W continuous into 4Ω	
MAX. OUTPUT LEVEL:	Video: VGA/UXGA: 2.85Vpp; Y/C: 2.8Vpp; CV: 3.8Vpp; Component video 2.7Vpp; CAT 5: 2Vpp	Audio: Group: 20dBm Master: 15dBm
BANDWIDTH (-3dB):	Video: VGA/UXGA: 300MHz; Y/C: 320MHz; CV: 420MHz; Component video: 380MHz; CAT 5: up to UXGA	Audio: Group: 46kHz Speakers: 40kHz Master: 33kHz
DIFF. GAIN:	VGA /UXGA: 0.15%; Y/C: 0.03%; CV: 0.03%; CAT 5: 6.4%	
DIFF. PHASE:	VGA /UXGA: 0.09 Deg; .Y/C: 0.03 Deg.; CV: 0.03 Deg.; CAT 5: 0.2 Deg.	
K-FACTOR:	<0.1%	
S/N RATIO:	Video: VGA/UXGA: 75dB Y/C: 81dB; CV: 75dB; Component video: 76dB; CAT 5: 59dB; (unweighted)	Audio: Group: 74dB Speakers: 53dB (max pwr weighted) Master out: 72dB
CROSSTALK (all hostile):	Video: VGA/UXGA: -45dB; Y/C: -48dB; CV: -41dB; Component video: -43dB	Audio: Group: < -76dB Master: < -69dB @1kHz
CONTROLS:	Channel selector for video and audio, for VGA/UXGA, Y/C and CV; master audio output selector, master audio level, mic audio level, talkover, lock, RS-232, RS-485, Ethernet, IR	
COUPLING:	Video: VGA/UXGA, Y/C and CV: DC	Audio: AC, input and output
AUDIO THD + NOISE@1kHz:	Group: 0.08%; Speakers: 2% (max pwr); Master: 0.25%	
AUDIO 2nd HARMONIC:	Group: 0.065%; Speakers: 1.6% (max pwr); Master: 0.155%	
POWER SOURCE:	100 - 264VAC, 50/60Hz, 37VA	
DIMENSIONS:	19" x 7" x 2U W, D, H	
WEIGHT:	3.8kg (8.4lbs) approx.	
ACCESSORIES:	Power cord, null-modem adapter, Windows®-based Kramer control software, Windows®-based Ethernet Configuration Manager and Virtual Serial Port Manager, infrared remote control transmitter	

1 Specifications are subject to change without notice

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10 Hex Table

Table 9 and Table 10 list the Hex values (which the protocol in section 11 describes in more detail) for the **VP-26** *Presentation Switcher*. RS-232 communication is at 9600 baud, no parity, 8 data bits and 1 stop bit.

Table 9: VP-26 Hex Table Video and Audio In-group IN-OUT 1 Selector

Inputs		VGA OUT 1	Composite Video OUT 1	s-Video OUT 1	Component Video OUT 1
Group	#				
VGA	In 1	01 81 81 81			
	In 2	01 82 81 81			
	In 3	01 83 81 81			
	In 4	01 84 81 81			
Composite Video	In 1		01 81 82 81		
	In 2		01 82 82 81		
	In 3		01 83 82 81		
	In 4		01 84 82 81		
s-Video	In 1			01 81 83 81	
	In 2			01 82 83 81	
	In 3			01 83 83 81	
	In 4			01 84 83 81	
Component Video	In 1				01 81 84 81
	In 2				01 82 84 81

Table 10: VP-26 Hex Table Video and Audio In-group IN-OUT 2 Selector

Inputs		VGA OUT 2	Composite Video OUT 2	s-Video OUT 2	Component Video OUT 2
Group	#				
VGA	In 1	01 81 85 81			
	In 2	01 82 85 81			
	In 3	01 83 85 81			
	In 4	01 84 85 81			
Composite Video	In 1		01 81 86 81		
	In 2		01 82 86 81		
	In 3		01 83 86 81		
	In 4		01 84 86 81		
s-Video	In 1			01 81 87 81	
	In 2			01 82 87 81	
	In 3			01 83 87 81	
	In 4			01 84 87 81	
Component Video	In 1				01 81 88 81
	In 2				01 82 88 81

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Hex Table

Table 11: VP-26 Master Audio Selector Hex Table

Master Audio Selector (Group Audio OUT)	Audio Master OUT
VGA Audio OUT 1	02 81 81 81
Composite Video Group Audio OUT 1	02 82 81 81
s-Video Group Audio OUT 1	02 83 81 81
Component Video Group Audio OUT 1	02 84 81 81
VGA Audio OUT 2	02 85 81 81
Composite Video Group Audio OUT 2	02 86 81 81
s-Video Group Audio OUT 2	02 87 81 81
Component Video Group Audio OUT 2	02 88 81 81
Microphone	02 8A 81 81
Disconnect All	02 80 81 81

10.1 Audio Gain Control Hex Tables

The following tables describe the audio gain controls.

Table 12: Set the Audio OUT 1 Gain Control for the Groups

Audio Gain Control for Groups				
VGA 1	**Composite Video 1**	**s-Video 1**	**Composite Video 1**	**Notes**
16 81 80 81	16 82 80 81	16 83 80 81	16 84 80 81	Mute
⋮	⋮	⋮	⋮	
16 81 EC 81	16 82 EC 81	16 83 EC 81	16 84 EC 81	0dB (1:1)
⋮	⋮	⋮	⋮	
16 81 FF 81	16 82 FF 81	16 83 FF 81	16 84 FF 81	9dB

Table 13: Set the Audio OUT 2 Gain Control for the Groups

Audio Gain Control for Groups				
VGA 2	**Composite Video 2**	**s-Video 2**	**Composite Video 2**	**Notes**
16 85 80 81	16 86 80 81	16 87 80 81	16 88 80 81	Mute
⋮	⋮	⋮	⋮	
16 85 EC 81	16 86 EC 81	16 87 EC 81	16 88 EC 81	0dB (1:1)
⋮	⋮	⋮	⋮	
16 85 FF 81	16 86 FF 81	16 87 FF 81	16 88 FF 81	9dB

Table 14: Set the Audio Output Gain Control for the Microphone

Audio Gain Control for Microphone	
16 8A 80 81	Mute
⋮	
16 8A CD 81	
⋮	
16 8A FF 81	Maximum

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Table 15: Set the Audio Output Gain Control for the Master Audio

Audio Gain Control for Master Out	
16 89 80 81	Mute
⋮	
16 89 F9 81	0dB
⋮	
16 89 FF 81	3dB

Table 16: Increase or Decrease the Audio Out 1 Gain by One Step

	VGA OUT 1	Composite Video OUT 1	s-Video OUT 1	Component Video OUT 1	Master Out	Microphone
Increase	18 81 80 81	18 82 80 81	18 83 80 81	18 84 80 81	18 89 80 81	18 8A 80 81
Decrease	18 81 81 81	18 82 81 81	18 83 81 81	18 84 81 81	18 89 81 81	18 8A 81 81
	VGA OUT 2	**Composite Video OUT 2**	**s-Video OUT 2**	**Component Video OUT 2**		
Increase	18 85 80 81	18 86 80 81	18 87 80 81	18 88 80 81		
Decrease	18 85 81 81	18 86 81 81	18 87 81 81	18 88 81 81		

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11 Communication Protocol

This protocol, which enables RS-232 communication between the **VP-26** and the PC, uses 4 bytes of information, and data is at 9600 baud, no parity, 8 data bits and 1 stop bit.

Table 17: Protocol Definitions

MSB **LSB**

	DESTINATION	INSTRUCTION					
0	D	N5	N4	N3	N2	N1	N0
7	6	5	4	3	2	1	0

1st byte

				INPUT			
1	0	0	0	0	I2	I1	I0
7	6	5	4	3	2	1	0

2nd byte

						OUTPUT	
1	0	0	0	0	0	O1	O0
7	6	5	4	3	2	1	0

3rd byte

			MACHINE NUMBER				
1	0	0	0	M3	M2	M1	M0
7	6	5	4	3	2	1	0

4th byte

1st BYTE: Bit 7 – Defined as 0.
D – "DESTINATION BIT".
This bit is always low, when sending from the PC to the switchers, and high for information sent to the PC.
N5…N0 – "INSTRUCTION".
These 6 bits define the function that is to be performed by the switcher(s). Similarly, if a function is performed via the machine's keyboard, then these bits are set with the INSTRUCTION NO, which was performed. The instruction codes are defined according to the table below (INSTRUCTION NO. is the value to be set for N5…N0).
2nd BYTE: Bit 7 – Defined as 1.
Bits 3 – 6 - Defined as 0.
I2… I0 – "INPUT".
For disconnect, set as 0. For other operations, these bits are defined according to Table 18.
3rd BYTE: Bit 7 – defined as 1.
Bits 2-6 defined as 0.
O1, O0 – "OUTPUT"
For operations, these bits are defined according to Table 18.
4th BYTE: Bit 7 – Defined as 1.
Bits 3-6 Defined as 0.
M3… M0 – "MACHINE NUMBER".
MACHINE NUMBER = (DIPSWITCH CODE) + 1.

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Table 18: Instruction Codes

INSTRUCTION		DEFINITION FOR SPECIFIC INSTRUCTION		NOTE
#	DESCRIPTION	INPUT	OUTPUT	
0	RESET MACHINE	0	0	1
1	SWITCH GROUPS	1-4 Set equal to video and audio inputs to be switched for the relative group	1-8 Set equal to group to which output is to be switched	2
2	SWITCH AUDIO OUTPUTS	1-10* Set equal to audio output to be switched to Master Audio out	1	2
5	REQUEST GROUP STATUS	0	1-8 Set equal to the group of which status is required	3
6	REQUEST STATUS OF MASTER AUDIO OUTPUT	0	1	3
8	BREAKAWAY SETTING	0	0 – Audio-follow-video 1 – Audio breakaway	2
11	REQUEST BREAKAWAY SETTING	0	0	3
16	ERROR	Don't care	0 – Invalid instruction 1 – Out of range	4
18	RESET MACHINE	0	0	1
22	SET AUDIO GAIN OF AUDIO OUTPUT	1-10*	Gain value	7
24	INCREASE/DECREASE AUDIO GAIN	1-10*	0 – Increase gain 1 – Decrease gain	8
25	REQUEST GAIN	1-10*	0 – Video gain 1 – Audio gain	3, 9
30	LOCK FRONT PANEL	0 – Panel unlocked 1 – Panel locked	0	
31	REQUEST WHETHER PANEL IS LOCKED	0	0	3
57	SET AUTO SAVE	1 – Autosave 2 – No save	Don't care	5
61	IDENTIFY MACHINE	1 or 2 – Machine name 3 or 4 – Program version	0 – request first 4 digits 1 – request first suffix 10 – request first prefix	6
62	DEFINE MACHINE	1 – Number of inputs 2 – Number of outputs	1 – For video 2 – For audio	3

* 1 – for VGA1, 2 – for CV1, 3 – for SV1, 4 – for YUV1, 5 – for VGA2, 6 – for CV2, 7 – for SV2, 8 – for YUV2, 9 – for master audio, 10 – for microphone

NOTES on to Table 18:

NOTE 1

When the master switcher is reset, (e.g. when it is turned on), the reset code is sent to the PC. If this code is sent to the switchers, it will reset according to the present power-down settings.

NOTE 2

These are bi-directional definitions. That is, if the switcher receives the code, it will perform the instruction; and if the instruction is performed (due to a keystroke operation on the front panel), then these codes are sent. For example, if:

0000 0001 Instruction "Switch Groups"
1000 0010 Input #2
1000 1001 in composite video group
1000 0001 Machine #1 (master)

Was sent from the PC, then the switcher (machine #1) will switch input 2 in composite video group to its output. If the user switched input 4 in the VGA group via the front panel keypad, then the switcher will send:

0100 0001
1000 0100
1000 0011
1000 0001 to the PC.

When the PC sends instruction #1 or #2 to the switcher, then, if the instruction is valid, the switcher replies by sending the same four bytes to the PC that were sent (except for the first byte, where the DESTINATION bit is set high).

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NOTE 3

The reply to a "REQUEST" instruction is as follows: the same instruction and input codes as were sent are returned, and the OUTPUT is assigned to the value of the requested parameter. The reply to the instruction #5 (what is the status of the VGA group?):
0000 0101
1000 0000
1000 0011
1000 0001
Would be:
0100 0101
1000 0000
1000 0100
1000 0001

NOTE 4

An error code is returned to the PC if an invalid code was sent to the switcher (for example, when trying to switch an input or a group which is greater than the highest one defined). This code is also returned to the PC if an RS-232 instruction is sent while the machine is being programmed via the front panel. Reception of this code by the switcher will not be valid.

NOTE 5

Under normal conditions, the machine's present status is saved each time a change is made. The power-down save (the auto save) may be disabled using this code. Note that each time that the machine is turned ON, the auto save function is automatically set.

NOTE 6

This is a request to identify the switchers in a system. If the INPUT is set as 1 or 2, the machine will send its name. The reply is the decimal value of the INPUT and the OUTPUT. For example, the reply to the request to send the machine's name (for machine #001) will be:
0111 1101
1000 0000 (i.e. 128+0)
1001 0111 (i.e. 128+23)
1000 0001
If the request for identification is sent with the INPUT set as 3 or 4, the appropriate machine will send its software version number. Again, the reply would be the decimal value of the INPUT and OUTPUT - the INPUT representing the number in front of the decimal point, and the OUTPUT representing the number following the decimal point. For example, for version 3.5 the reply will be:
0111 1101
1000 0011 (i.e. 128+3)
1000 0101 (i.e. 128+5)
1000 0001

NOTE 7

GAIN VALUE – Number from 0 to 127

NOTE 8

Answer = Current Audio Gain (0 –127)

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LIMITED WARRANTY

Kramer Electronics (hereafter *Kramer*) warrants this product free from defects in material and workmanship under the following terms.

HOW LONG IS THE WARRANTY

Labor and parts are warranted for seven years from the date of the first customer purchase.

WHO IS PROTECTED?

Only the first purchase customer may enforce this warranty.

WHAT IS COVERED AND WHAT IS NOT COVERED

Except as below, this warranty covers all defects in material or workmanship in this product. The following are not covered by the warranty:

1. Any product which is not distributed by Kramer, or which is not purchased from an authorized Kramer dealer. If you are uncertain as to whether a dealer is authorized, please contact Kramer at one of the agents listed in the Web site www.kramerelectronics.com.
2. Any product, on which the serial number has been defaced, modified or removed, or on which the WARRANTY VOID IF TAMPERED sticker has been torn, reattached, removed or otherwise interfered with.
3. Damage, deterioration or malfunction resulting from:
   i) Accident, misuse, abuse, neglect, fire, water, lightning or other acts of nature
   ii) Product modification, or failure to follow instructions supplied with the product
   iii) Repair or attempted repair by anyone not authorized by Kramer
   iv) Any shipment of the product (claims must be presented to the carrier)
   v) Removal or installation of the product
   vi) Any other cause, which does not relate to a product defect
   vii) Cartons, equipment enclosures, cables or accessories used in conjunction with the product

WHAT WE WILL PAY FOR AND WHAT WE WILL NOT PAY FOR

We will pay labor and material expenses for covered items. We will not pay for the following:

1. Removal or installations charges.
2. Costs of initial technical adjustments (set-up), including adjustment of user controls or programming. These costs are the responsibility of the Kramer dealer from whom the product was purchased.
3. Shipping charges.

HOW YOU CAN GET WARRANTY SERVICE

1. To obtain service on you product, you must take or ship it prepaid to any authorized Kramer service center.
2. Whenever warranty service is required, the original dated invoice (or a copy) must be presented as proof of warranty coverage, and should be included in any shipment of the product. Please also include in any mailing a contact name, company, address, and a description of the problem(s).
3. For the name of the nearest Kramer authorized service center, consult your authorized dealer.

LIMITATION OF IMPLIED WARRANTIES

All implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to the length of this warranty.

EXCLUSION OF DAMAGES

The liability of Kramer for any effective products is limited to the repair or replacement of the product at our option. Kramer shall not be liable for:

1. Damage to other property caused by defects in this product, damages based upon inconvenience, loss of use of the product, loss of time, commercial loss; or:
2. Any other damages, whether incidental, consequential or otherwise. Some countries may not allow limitations on how long an implied warranty lasts and/or do not allow the exclusion or limitation of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights, which vary from place to place.

NOTE: All products returned to Kramer for service must have prior approval. This may be obtained from your dealer.

This equipment has been tested to determine compliance with the requirements of:

EN-50081:	"Electromagnetic compatibility (EMC); generic emission standard. Part 1: Residential, commercial and light industry"
EN-50082:	"Electromagnetic compatibility (EMC) generic immunity standard. Part 1: Residential, commercial and light industry environment".
CFR-47:	FCC* Rules and Regulations: Part 15: “Radio frequency devices Subpart B Unintentional radiators”

CAUTION!

- Servicing the machines can only be done by an authorized Kramer technician. Any user who makes changes or modifications to the unit without the expressed approval of the manufacturer will void user authority to operate the equipment.
- Use the supplied DC power supply to feed power to the machine.
- Please use recommended interconnection cables to connect the machine to other components.

* FCC and CE approved using STP cable (for twisted pair products)

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For the latest information on our products and a list of Kramer distributors, visit our Web site: www.kramerelectronics.com where updates to this user manual may be found.
We welcome your questions, comments and feedback.

Caution

Safety Warning:
Disconnect the unit from the power supply before opening/servicing.

Kramer Electronics, Ltd.
Web site: www.kramerelectronics.com
E-mail: info@kramerel.com
P/N: 2900-300238 REV 3

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